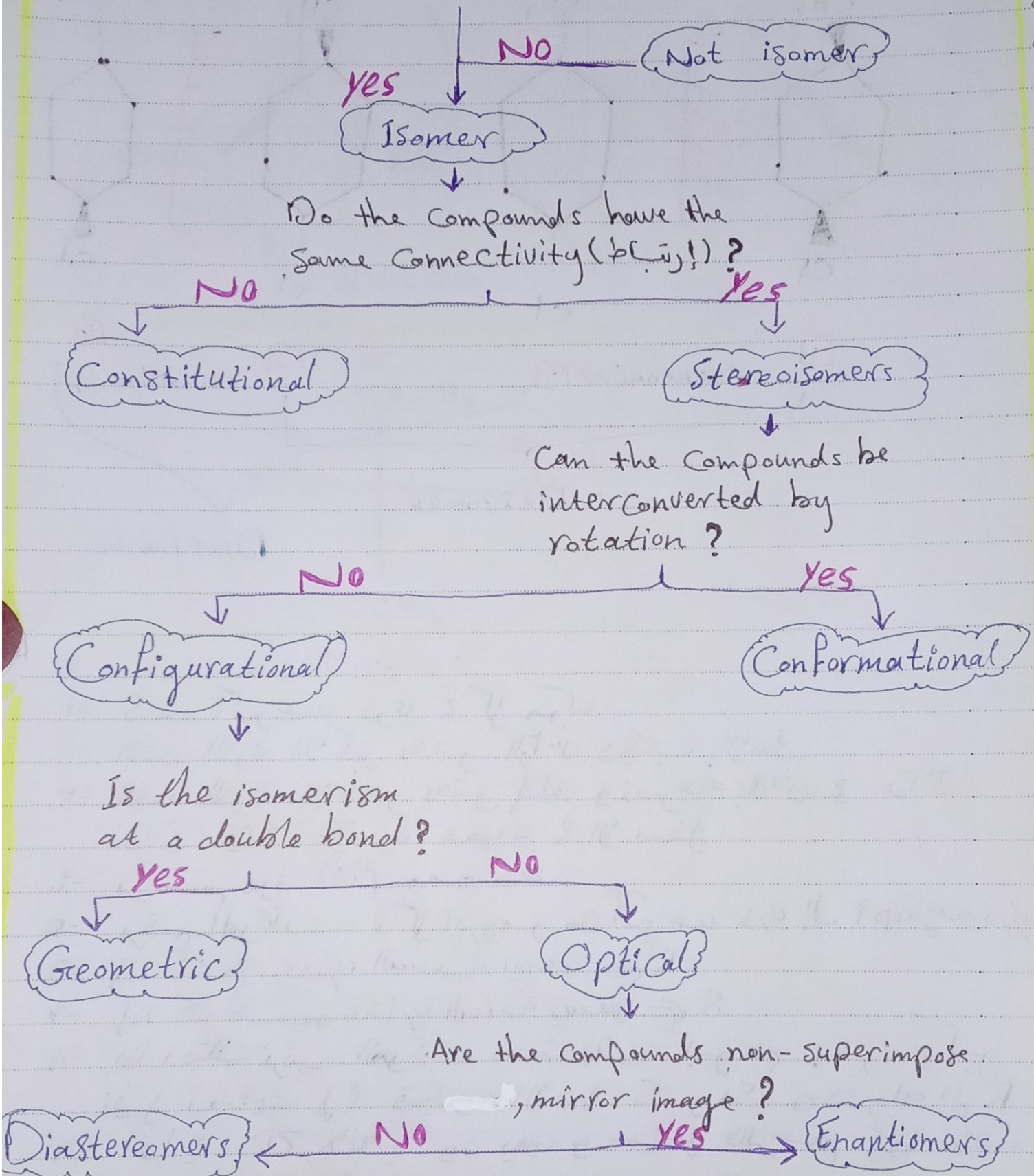
Do the compounds have the same molecular formula ?
No
Not isomer
Yes
Isomer
Do the compounds have the same Connectivity (ترابط) ?
No
Yes
Constitutional
Stereoisomers
Can the compounds be interconverted by rotation ?
No
Yes
Configurational
Conformational
Is the isomerism at a double bond ?
Yes
No
Geometric
Optical
Are the compounds non-superimpose, mirror image ?
Diastereomers
No
Yes
Enantiomers

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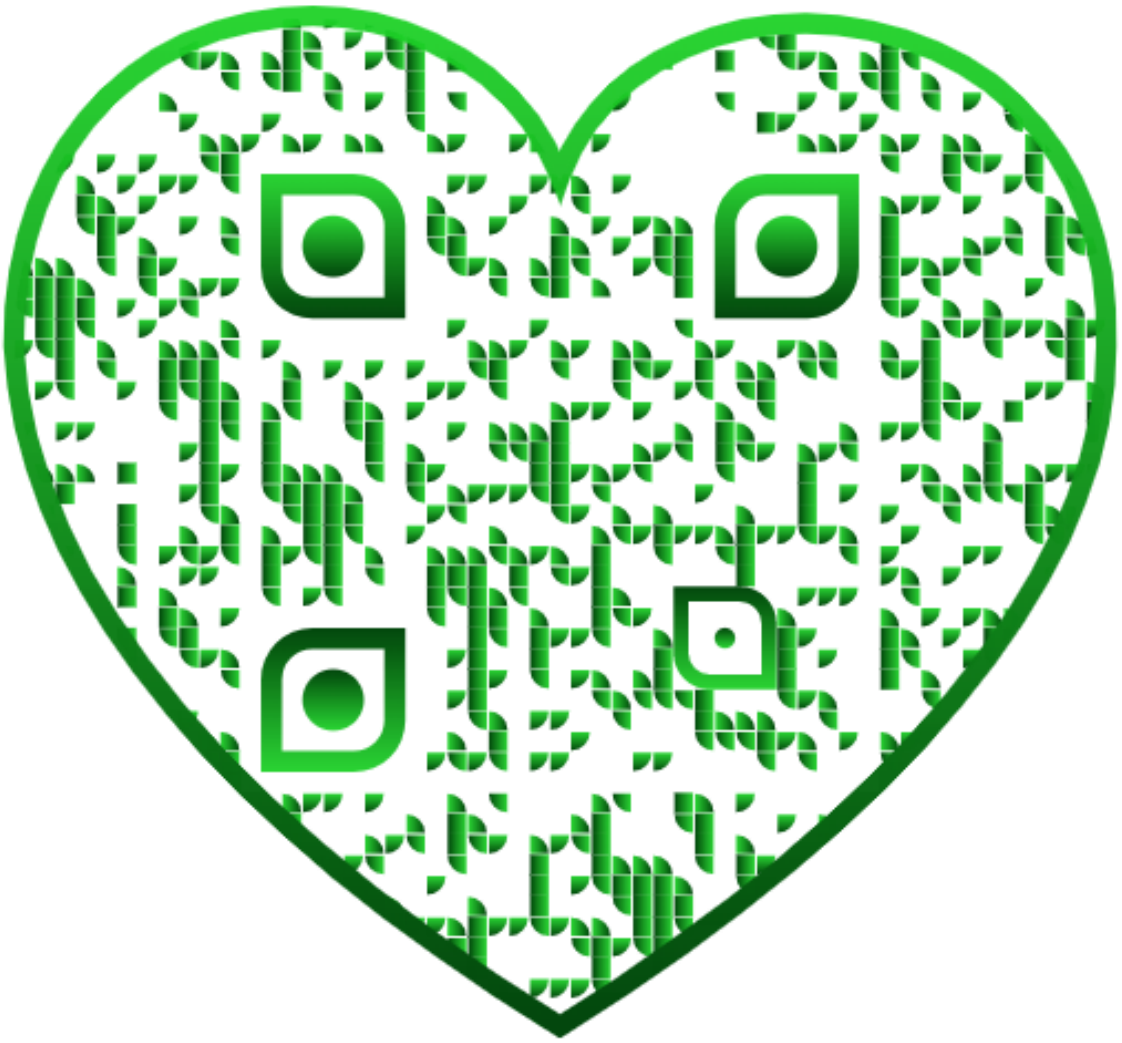


* Importance of stereochemistry :
- synthesis of drugs.

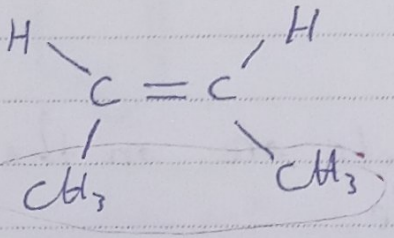
* Most drugs composed of :
- active stereoisomer, and another may be inactive
- active stereoisomer, and the other may be toxic
- active stereoisomer, and the other may be active.

* Geometric [Cis - Trans] isomers result from restriction rotation.

Geometric

Double
- Cis ⇒ together (Z)
- Trans ⇒ opposite (E)

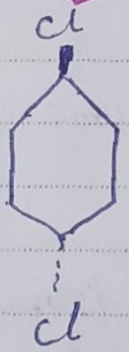
ex:



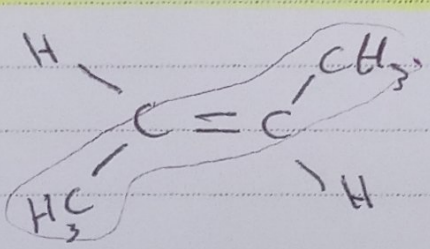
Cis = Z

Ring

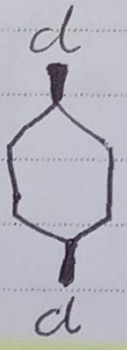
Cycloalkenes



Trans = E



Trans = E

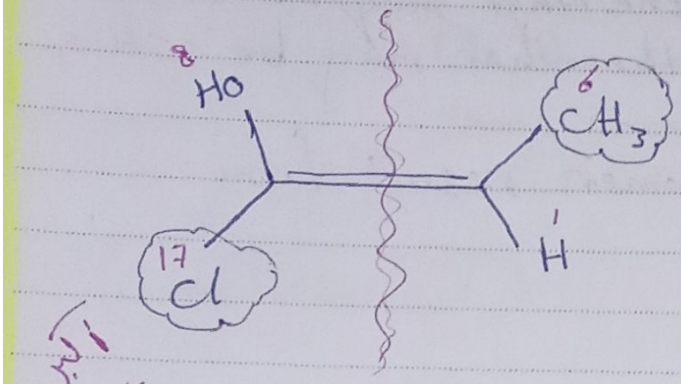


Cis = Z

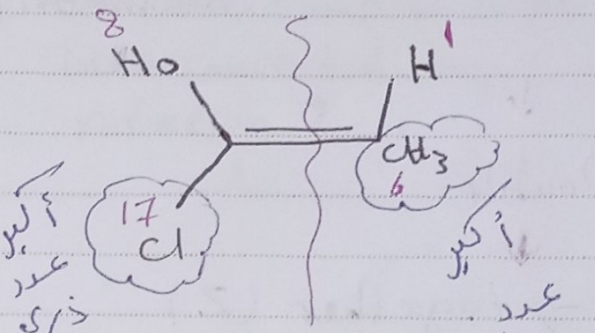
في حالة إذا اختلفوا المركبات في الأيزومرز (Cis-Trans) يتم تحديد Cis and Trans عن طريق:

- تقسيم المركب إلى جزئين يمين وشمال
- البحث عن العدد الذري الأكبر للمركبات في كل جهة
- العدد الذري الأكبر هو يمثل (Cis - Trans)

مثال/



⇒ Trans = E



Cis = Z ⇐

Cis isomer ⇒ The compounds are on the same side.

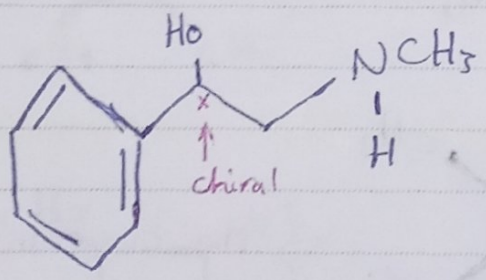
Trans isomer ⇒ The compounds are on the opposite side.

[3]

Chiral	Achiral
- asymmetric - stereoCenter - Stereogenic center - not superimpose - mirrore image	- symmetric - superimpose - mirror image

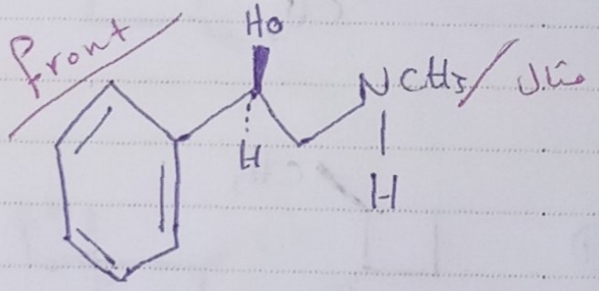
* Enantiomer ⇒ Mirror image , not superimpose
* Diastereomers ⇒ Not mirror image , not superimpose

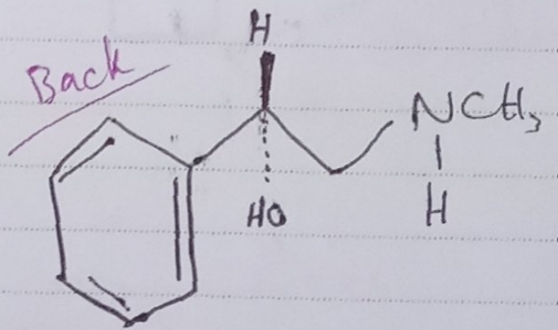
* كيف يتم معرفة إذا كان الدواء متماثل أم غير متماثل ؟
- إذا رسم الدواء على شكل front and back
or
bold and dash
فيكون الدواء في هذه الحالة متماثل، والعكس.



{ غير متماثل }

مثال





{ متماثل }

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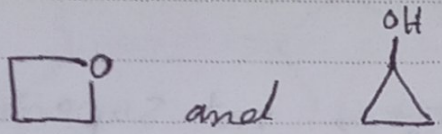
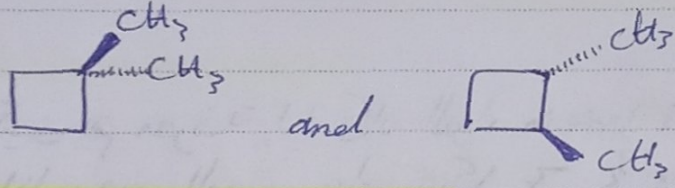
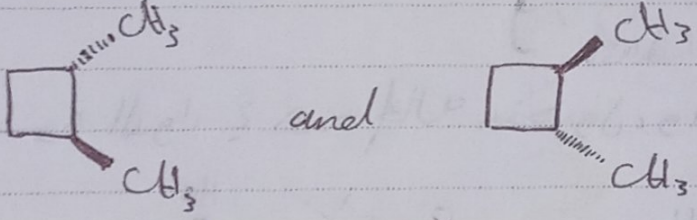
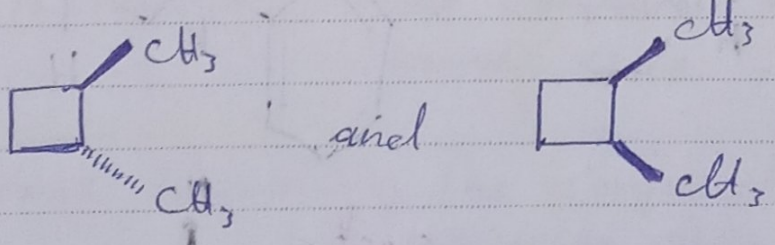
* Other importance of stereochemistry:
1- Increase receptors selectivity and potency.
2- Increase safety margin.
3- Decrease adverse effects of the drug.
4- Decrease dose given to the patient
5- Decrease the interaction of drug.

ex:

①  and ⇒ structural isomer

②  and ⇒ structural isomer

③  and ⇒ enantiomer isomer

④  and ⇒ diastereomer isomer

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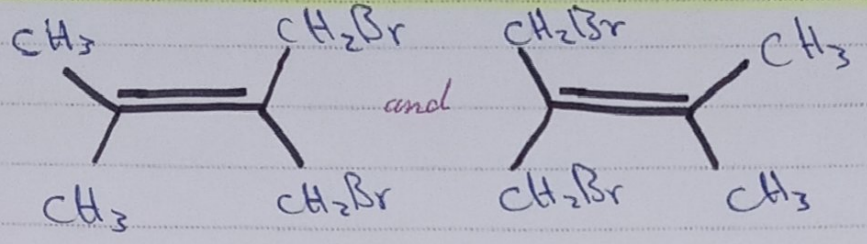
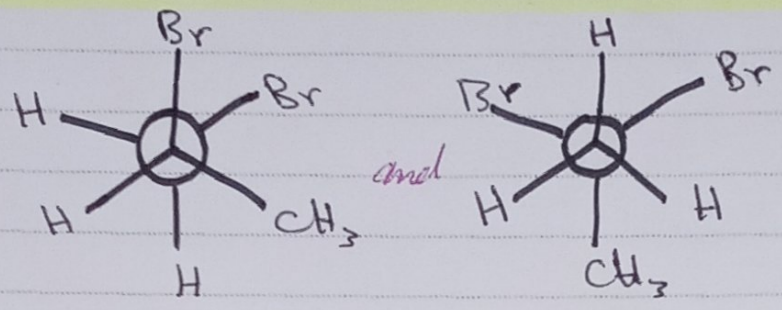
Examples

5



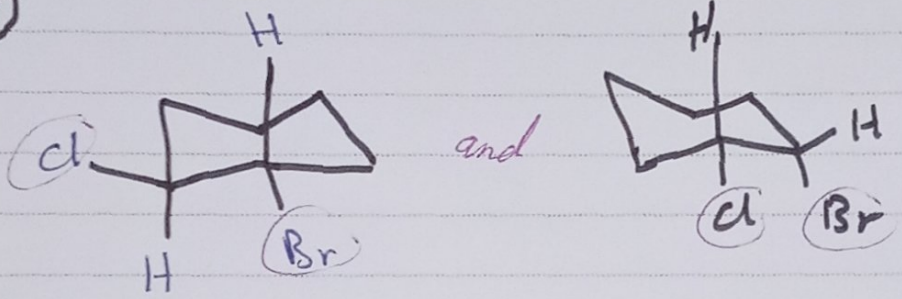
⇒ The same (Identical)

6



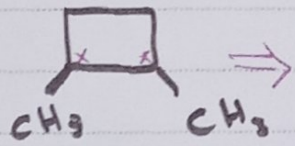
⇒ Structural

7



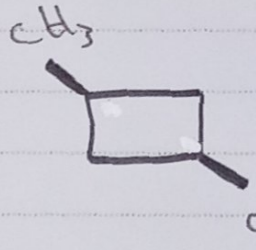
⇒ Cis - Trans

1



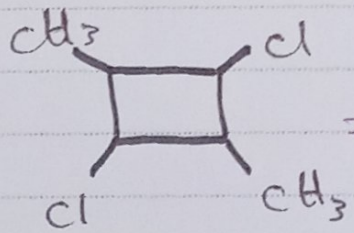
⇒ Chiral

2



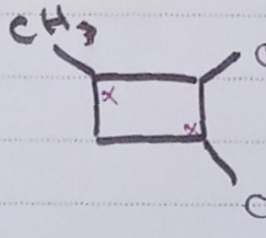
⇒ Achiral

3



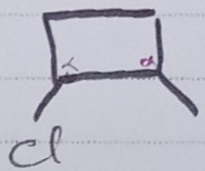
⇒ Achiral

4



⇒ Chiral

5



⇒ Chiral

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